Bendix® TC-7™ Trailer Control Brake Valve

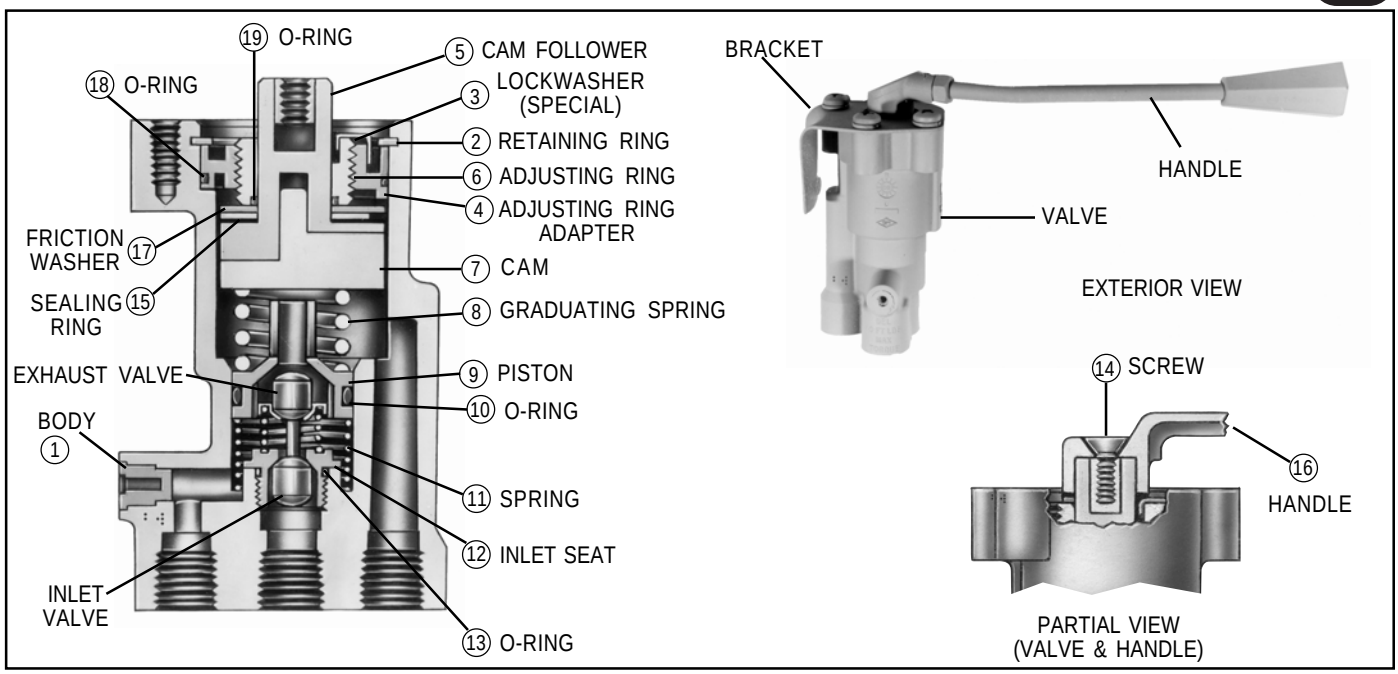

FIGURE 1

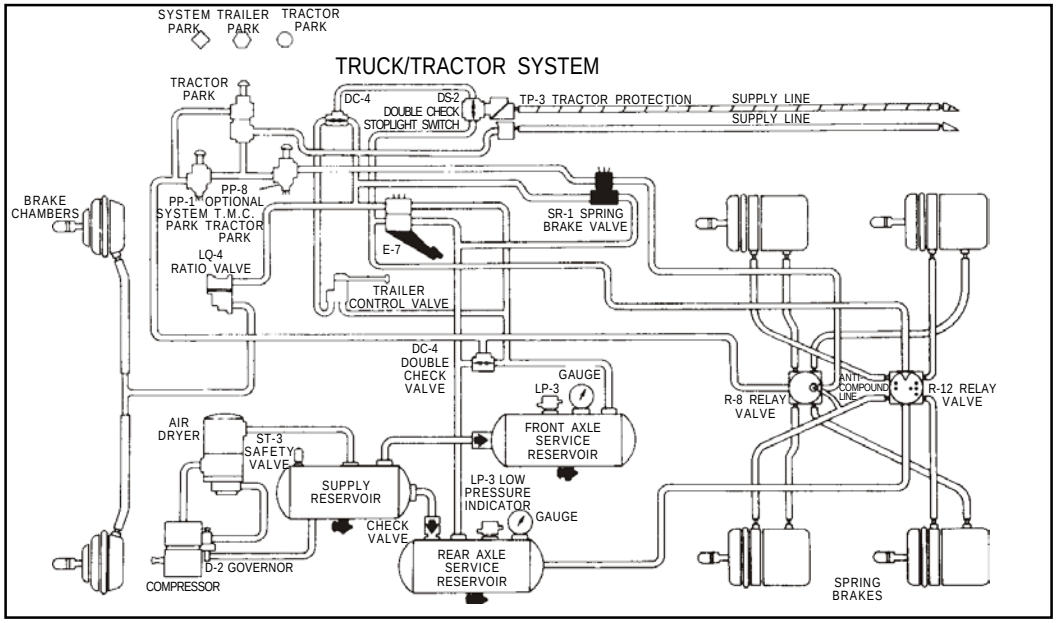

FIGURE 2 - TYPICAL PIPING DIAGRAM

DESCRIPTION

The TC-7™ trailer control brake valve is a hand operated control valve that provides graduated control of service brake air pressure. The most common vehicle application is the independent control of the trailer's service brakes on a tractor trailer combination.

Typically, the TC-7™ valve is mounted either inside the steering column or clamped to the exterior of the column. The three basic components of the TC-7™ valve are available separately (valve, handle, bracket) to accommodate the appropriate mounting configuration.

Because of its use as a trailer service brake control valve, the TC-7™ valve should NOT be used in lieu of the vehicle parking brakes. The handle is marked NOT FOR PARKING. In general the TC-7™ valve should not be in use and left unattended.

OPERATION

APPLYING

When the handle or actuating lever is moved in a clockwise direction from the released position, force is exerted on the pressure graduating spring through the action of the cam and cam follower. The force of the spring on the piston causes it to move down.

The exhaust seat, which is in the center of the piston, contacts the exhaust valve and closes the exhaust passage in the piston. The continued downward movement of the piston moves the inlet valve-off its seat. Reservoir air pressure flows by the open inlet valve and out the delivery port.

HOLDING

The air pressure that flows by the open inlet valve also becomes effective on the bottom area of the piston. As the force of the air pressure beneath the piston balances the force of the depressed graduating spring above, the piston lifts slightly and the inlet valve returns to its seat. The exhaust valve remains seated so the flow of air through the valve is stopped and air pressure in the service line is held.

RELEASING

When the handle or operating lever is moved in a counterclockwise direction the force above the piston is decreased. The air pressure beneath will then lift the piston, moving it away from the exhaust valve. With the exhaust passage open, air pressure in the service line will exhaust out the exhaust port of the valve.

PREVENTIVE MAINTENANCE

Important: Review the warranty policy before performing any intrusive maintenance procedures. An extended warranty may be voided if intrusive maintenance is performed during this period.

Because no two vehicles operate under identical conditions, maintenance and maintenance intervals will vary. Experience is a valuable guide in determining the best maintenance interval for any one particular operation.

Visually check for physical damage to the brake valve such as broken air lines and broken or missing parts.

Every 3 months, 25,000 miles (40,000 km.) or 900 operating hours perform Operating and Leakage Tests.

SERVICE CHECKS

OPERATING TEST

Park the vehicle on a level surface and block the wheels.

Connect an accurate test gauge to the delivery port of the TC-7™ valve or connect the gauge to the service hose coupling of the tractor. When the gauge is connected to the service hose coupling, install a dummy hose coupling on the supply (emergency) hose coupling and place the tractor protection control in the trailer charging position. When the TC-7™ valve handle is moved to the fully applied position, the gauge should register full reservoir pressure.

NOTE: Some valves may be preset to deliver lower than reservoir pressure; however, the standard valves generally used on tractors are set to deliver full reservoir pressure. Intermediate positions should deliver proportional intermediate pressures. Upon release, the gauge should immediately register zero.

LEAKAGE TEST

Locate the exhaust port or exhaust line and apply a soap solution. (It is common practice to connect a line from the valve exhaust port to a location remote from the immediate driver's area.) With the valve in the released position, exhaust leakage should not exceed a 1" bubble in 5 seconds (100 sccm).

With the valve fully applied, leakage at the exhaust should not exceed a 1" bubble in 3 seconds (175 sccm).

If the valve does not function as described or leakage is excessive, it is recommended that it be replaced with a new or remanufactured unit, or repaired with genuine parts available at Bendix outlets.

REMOVAL & INSTALLATION

The removal, disassembly, assembly and installation procedures are number keyed to the sectional and exterior views of the TC-7™ valve in Figure 1.

REMOVAL

1. Block the wheels or hold the vehicle on a level surface by means other than air brakes.
2. Drain all air pressure from all reservoirs.
3. Identify the air lines and connections and remove from the TC-7™ valve.
4. Consult the vehicle manual for instructions on disassembly of the steering column components.

NOTE: Some TC-7™ valve installations will be on the exterior of the steering column, in which case Step 4 can be disregarded.

5. Remove the TC-7™ valve handle(16) by first removing the flat head Phillips machine screw(14) from the center of the head/handle assembly.
6. Dismount the TC-7™ valve from the steering column.

DISASSEMBLY

The following assembly and disassembly instructions are written for the use of a Bendix Maintenance Kit 102145.

If the valve is disassembled in a vise, be sure that the vise is not overtightened as the body and internal parts will distort.

1. Remove and discard the adjusting ring lockwasher(3).
2. Remove and retain adjusting ring(6).

NOTE: A spanner wrench can be used to rotate the adjusting ring, but if such a wrench is not available, the adjusting ring can be returned with a small screwdriver inserted in one of the inner notches of the ring.

3. Remove and discard retaining ring(2).
4. Remove adjusting ring adapter(4), cam follower(5), sealing ring(15) and friction washer(17). Discard sealing ring(15) and o-rings (18 & 19). Retain all other parts.

NOTE: Note whether friction washer is installed with ribs against or away from sealing ring. Must be installed same-way during assembly.

5. Remove and retain cam(7) and graduating spring(8).
6. Remove and retain piston(9). Remove and discard o-ring(10) from piston(9).
7. Remove and discard piston return spring(11).
8. Using an 11/16" deep well socket wrench, remove and discard inlet and exhaust valve assembly(12) and o-ring(13).

ASSEMBLY

Prior to assembly, wash parts retained during disassembly in mineral spirits and dry thoroughly. Using Bendix lubricant 291126 or a silicone lubricant equivalent to Dow Corning 55-M, lubricate the body bores, cam, cam follower and all o-rings and o-ring grooves. NOTE: Do not lubricate sealing ring, friction washer or cam follower serrations.

1. Install o-ring(13) on inlet and exhaust valve assembly(12) and using an 11/16" deep well socket wrench, install inlet and exhaust valve assembly(12). Torque to 15 inch pounds.
2. Install piston return spring(11).
3. Install o-ring(10) on piston(9) and install piston(9) in body(1).
4. Install graduating spring(8) in body(1).
5. Install cam(7) in body(1) with flat side toward graduating spring. Index cam “ears” to corresponding slots in body.
6. Install rubber sealing ring(15) on cam follower(5).
7. Install the friction washer(17) on cam follower(5) in same manner as noted in Step 4 of Disassembly.
8. Install cam follower(5) in body.

NOTE: Stop “ear” on cam follower will not permit improper assembly of cam follower; however, make certain that the positioning “ear” of the friction washer fits in the wide slot in the body.

9. Install o-ring(18) in adjusting ring adapter(4) and install o-ring(19) in adjusting ring(6).
10. Install adjusting ring(6) in adapter(4) until adjusting ring is flush with the underside of the adapter.

NOTE: There are two indexing lugs on the adapter that fit into slots in the valve body when the adapter is installed. Be sure to install the adjusting ring with its wrench slots accessible (up) after the valve is assembled.

11. Position the adapter(4) and adjusting ring(6) assembly over the cam follower(5), making certain the adapter lugs fit into the body slots.
12. Push down on cam follower(5) and install snap ring(2). Be certain the snap ring is completely seated in its groove.

NOTE: If lugs on adapter(4) are not in their body slots, the snap ring cannot be installed completely.

13. Before installing the lockwasher(3), adjust the valve as described.

ADJUSTMENT

Generally, the TC-7™ brake valve should deliver full reservoir pressure; however, there are a few exceptions in special applications.

1. If the delivered pressure is below specified final delivery pressure, it can be adjusted by removing the head and adjusting ring lockwasher and rotating the adjusting ring clockwise to raise the delivery pressure.

   Care should be taken not to raise the delivery pressure beyond the design limits; exhaust opening could be restricted.

2. If the delivery pressure is above specified final delivery pressure, it can be lowered by rotating the adjusting ring counter-clockwise.

NOTE: A spanner wrench can be used to rotate the adjusting ring, but if such a wrench is not available, the adjusting ring can be turned with a small screwdriver inserted in one of the inner notches of the ring.

3. After adjustment is complete, install lockwasher(3) to hold the adjustment.

INSTALLATION

1. Using the identification made during removal, reconnect the air lines to the TC-7™ valve. NOTE: Maximum torque for fittings is 10 ft. lbs.
2. Consult the vehicle manual for instructions on remounting the TC-7™ valve in or on the steering column. Do not overtorque the three 1/4-20 mounting screws. (30-60 inch pounds) (3.39-6.77 kPa)
3. Remount the TC-7™ valve handle(16) on the hex cam follower(5) and secure flat head screw(14). Torque to 30-60 inch pounds. (3.39-6.77 kPa)

   NOTE: Handle position cannot be adjusted.

WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following general precautions should be observed at all times.

1. **Park the vehicle on a level surface, apply the parking brakes, and always block the wheels. Always wear safety glasses.**
2. **Stop the engine and remove ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, EXTREME CAUTION should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components.**
3. **Do not attempt to install, remove, disassemble or assemble a component until you have read and thoroughly understand the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.**
4. **If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with an AD-IS™ air dryer system or a dryer reservoir module, be sure to drain the purge reservoir.**
5. **Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.**
6. **Never exceed manufacturer's recommended pressures.**
7. **Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.**
8. **Use only genuine Bendix® replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.**
9. **Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.**
10. **Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.**

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